EPA Region 7 TMDL Review

TMDL ID	337	*Water Body ID*	IA 06-LSR-02830
Water Body Name	Upper Gar Lake		
Pollutant	Algae and Turbidity		
Tributary	East Okoboji Lake		
State	Iowa *HUC*	1023000301	
Basin	Little Sioux River		
Submittal Date	12/28/2004		
Approved	Yes		

Submittal Letter

State submittal letter indicates final TMDL(s) for specific pollutant(s)/ water(s) were adopted by the state, and submitted to EPA for approval under section 303(d) of the Clean Water Act.

The TMDL for Upper Gar Lake was formally submitted by the Iowa Department of Natural Resources (IDNR) in a letter dated December 14, 2004 and received by EPA on December 28, 2004.

Water Quality Standards Attainment

The water body's loading capacity for the applicable pollutant is identified and the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources is described. TMDL and associated allocations are set at levels adequate to result in attainment of applicable water quality standards.

Noxious aquatic plants are associated with excessive nutrient (phosphorus) loadings. Elevated phosphorus loading is the cause of the impairment of Primary Contact Recreation (Class A1), Secondary Contact Recreation (Class A2), Aquatic Life (Class B(LW)) and High Quality (HQ) uses. Reducing the total phosphorus load by 3,000 pounds to 3,080 pounds per year will result in the attainment of water quality standards.

Numeric Target(s)

Submittal describes applicable water quality standards, including beneficial uses, applicable numeric and/or narrative criteria. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, site specific if possible, was developed from a narrative criterion and a description of the process used to derive the target is included in the submittal.

Water quality standards and beneficial uses are described as well as applicable narrative criteria. Upper Gar's uses are Primary Contact Recreation (Class A1), Secondary Contact Recreation (Class A2), Aquatic Life (Class B(LW)) and High Quality (HQ). Phase I targets for this phased TMDL are established based on improving the lake's trophic state to correspond phosphorus loading resulting in a Trophic State Index (TSI) value for total phosphorus of <65, and for both chlorophyll and Secchi depth of <60.

Link Between Numeric Target(s) and Pollutant(s) of concern

An explanation and analytical basis for expressing the TMDL through surrogate measures (e.g., parameters such as percent fines and turbidity for sediment impairments, or chlorophyll-a and phosphorus loadings for excess algae) is provided, if applicable. For each identified pollutant, the submittal describes analytical basis for conclusions, allocations and margin of safety that do not exceed the load capacity.

Based on linkages between phosphorus, algae (chlorophyll) and turbidity (Secchi depth) expressed by trophic state indices, a decrease in total phosphorus will result in a decrease in algal concentrations and turbidity. By reducing the TSI for total phosphorus to <65 the TSIs for chlorophyll and Secchi depth should be reduced to <60 based on the relationships seen in this lake. This will result from a decrease in phosphorus load of 48%, and result in a decrease in chlorophyll of 56% and an increase in transparency of 43%.

Source Analysis

Important assumptions made in developing the TMDL, such as assumed distribution of land use in the watershed, population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources, are described. Point, non point and background sources of pollutants of concern are described, including magnitude and location of the sources. Submittal demonstrates all significant sources have been considered.

There are no significant point source contributions of phosphorus to the lake. Annual loading from nonpoint sources include 1.) inflow from East Okoboji Lake (which receives inflow from West Okoboji Lake) and internal load, these sources are not considered separately, 2.) watershed draining directly to the lake and 3.) airborne deposition which account for the estimated 6,080 pounds of phosphorus per year. The dominant land use in the immediate watershed is grassland, there is medium density residential development on the lake and a game management area east of the lake. The larger overall drainage area including the watersheds of lakes East and West Okoboji are over 120 times that of the immediate watershed. The land use for this larger area is addressed in Appendix A. All significant sources of phosphorus seem to have been considered.

Allocation

Submittal identifies appropriate wasteload allocations for point, and load allocations for nonpoint sources. If no point sources are present the wasteload allocation is zero. If no nonpoint sources are present, the load allocation is zero.

Phase I of this TMDL is to reduce phosphorus loading to achieve an in-lake TSITP<65 resulting in TSIs for Secchi depth and chlorophyll of <60. This will be accomplished with a total phosphorus loading capacity of 3,080 pounds per year.

WLA Comment

There are no significant point sources for phosphorus in the watershed. The WLA is set to zero.

LA Comment

The load allocation based on target TSITP<65 is 2,780 pounds of phosphorus per year. Of this 2,770 pounds are allotted to inflows and watershed sources and 10 pounds to atmospheric deposition.

Margin of Safety

Submittal describes explicit and/or implicit margin of safety for each pollutant. If the MOS is implicit, the conservative assumptions in the analysis for the MOS are described. If the MOS is explicit, the loadings set aside for the MOS are identified and a rationale for selecting the value for the MOS is provided.

The margin of safety is explicit. The MOS is set at 300 pounds per year, this is 10% of the calculated allowable load.

Seasonal Variation and Critical Conditions

Submittal describes the method for accounting for seasonal variation and critical conditions in the TMDL(s).

TSI targets are applied to the growing season when algal blooms are prevalent. The model selected uses growing season mean total phosphorus concentration to calculate an average annual total phosphorus load.

Public Participation

Submital describes public notice and public comment opportunity, and explains how the public comments were considered in the final TMDL(s).

TMDL staff met with the East Okoboji Lakes Improvement Corporation on May 20, 2004, also attending were representatives from multiple lake associations, state and county government and environmental groups and volunteers. The draft TMDL was presented at a public meeting in Arnolds Park on November 22, 2004. Comments received were evaluated and incorporated into the TMDL where appropriate.

Monitoring Plan for TMDL(s) Under Phased Approach

The TMDL identifies the monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of WQS, and a schedule for considering revisions to the TMDL(s) (where phased approach is used).

Follow-up monitoring will continue to meet, at a minimum, the minimum data requirements established by Iowa's 305(b) guidelines. An assessment will be completed by 2010

containing 3 lake samples per year for three years or 10 lake samples over a two year period. The TMDL program expressed its commitment to follow-up monitoring.

Reasonable assurance

Reasonable assurance only applies when reduction in nonpoint source loading is required to meet the prescribed waste load allocations.

No allowances for increased nonpoint source phosphorus loading were included in the TMDL. Significant changes in the watershed land use was deemed unlikely. No waste load allocation is included in this TMDL.